

Appl. No. 10/000,228
Response Dated November 9, 2005
Reply to Final Office Action of September 9, 2005

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A method to perform speech recognition, comprising:
receiving a set of signals representing speech;
receiving a request for speech recognition information over a voice channel,
wherein receiving said request comprises receiving a subrogation indicator;
creating a set of speech features from said signals; and
communicating said speech features over said voice channel at a lower bandwidth than a bandwidth associated with said set of signals representing said speech when said subrogation indicator is detected.
2. (Previously Presented) The method of claim 1, wherein said receiving said request comprises:
receiving a prompt for a voice command.
3. (Previously Presented) The method of claim 1, wherein said subrogation indicator is a predefined pattern of bits.
4. (Original) The method of claim 1, wherein said creating comprises:
extracting said speech features from said signals; and

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compressing said speech features.

5. (Original) The method of claim 4, further comprising applying error correction to said compressed speech features.
6. (Original) The method of claim 4, further comprising determining periods of silence in said signals.
7. (Original) The method of claim 1, wherein said communicating comprises:
creating a first stream of bits representing said speech;
receiving a second stream of bits representing said speech features;
replacing said first stream of bits with said second stream of bits; and
sending said second stream of bits over said voice channel.
8. (Original) The method of claim 7, wherein said creating comprises:
receiving an analog audio waveform representing said speech;
converting said analog audio waveform into a digital audio signal; and
compressing said digital audio signal using a voice encoding algorithm.
9. (Original) The method of claim 7, wherein said replacing comprises:
determining a start point and an end point for said first stream of bits;
determining a start point and an end point for said second stream of bits; and

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replacing said first stream of bits with said second stream of bits using said start points and said end points.

10. (Original) The method of claim 9, wherein said replacing said first stream of bits with said second stream of bits using said start points and said end points, comprises:

- (a) creating a frame of bits from said start point for said first stream of bits;
- (b) overlaying said frame of bits with said start point for said second stream of bits;
- (c) sending said frame of bits over said voice channel; and
- (d) continuing (a)-(c) until said end point for said second stream of bits is reached.

11. (Original) The method of claim 9, wherein said sending comprises:

inserting a start indicator before said start point for said second stream of bits, and an end indicator after said end point for said second stream of bits; and sending said second stream of bits with said start and end indicators.

12. (Currently Amended) A method to perform speech recognition, comprising:

sending a request for speech recognition information over a voice channel, wherein said sending comprises sending a subrogation indicator to initiate a communication of speech features over said voice channel at a lower bandwidth than a bandwidth associated with a set of signals representing speech when said subrogation indicator is detected;

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receiving said speech features over said voice channel; and
recognizing speech using said speech features.

13. (Previously Presented) The method of claim 12, wherein said sending:
sending a prompt for a voice command.
14. (Previously Presented) The method of claim 12, wherein said subrogation
indicator is a predefined pattern of bits.
15. (Original) The method of claim 12, wherein said receiving comprises:
 - (a) determining a start point and end point for a stream of bits;
 - (b) reconstructing said speech features from said start point;
 - (c) decompressing said speech features;
 - (d) sending said decompressed speech features to a speech recognition device;
and
 - (e) performing (a)-(d) until said end point is reached.
16. (Original) The method of claim 15, further comprising:
extracting error correction information from said stream of bits; and
determining whether said speech features include errors using said error
correction information.
17. (Currently Amended) A system to perform speech recognition, comprising:

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a source node to receive a subrogation indicator and to send speech features over a voice channel at a lower bandwidth than a bandwidth associated with a set of signals representing speech when said subrogation indicator is detected;

a destination node to receive said speech features and perform speech recognition;
~~wherein to perform said speech recognition comprises sending a subrogation indicator;~~
and

a network to communicate said speech features between said source node and said destination node by overlaying said speech features on a voice channel.

18. (Original) The system of claim 17, wherein said source node comprises:

a transceiver to communicate information with said destination node;

a capabilities monitor to monitor for a request for speech recognition information from said transceiver;

a vocoder to create a first stream of bits representing speech;

a feature encoder to create a second stream of bits representing speech features of said speech; and

a feature overlayer to overlay said first stream of bits with said second stream of bits, and send said second stream of bits to said transceiver for communication to said destination node.

19. (Original) The system of claim 17, wherein said feature encoder comprises:

a feature extractor to extract said speech features from said speech; and

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a feature compressor to compress said speech features into said second stream of bits.

20. (Original) The system of claim 17, wherein said destination node comprises:

a transceiver to communicate information with said source node;

a capabilities broadcaster to communicate a speech recognition request to said source node;

a start monitor to monitor for a stream of bits having speech features from said transceiver;

a feature decoder to decode speech features from said stream of bits; and

a speech recognition module to translate said speech features into text.

21. (Original) The speech recognition decoder of claim 20, wherein said feature decoder comprises:

a feature reconstructor to reconstruct speech features from said stream of bits; and

a feature decompressor to decompress said reconstructed speech features.

22. (Original) The system of claim 17, wherein said network is a wireless network.

23. (Currently Amended) A speech recognition encoder, comprising:

a capabilities monitor to monitor for a request for speech recognition information, wherein said speech recognition information comprises a subrogation indicator;

a vocoder to create a first stream of bits representing speech;

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a feature encoder to create a second stream of bits representing speech features of said speech; and

a feature overlayer to overlay said first stream of bits with said second stream of bits and to communicate said second stream of bits at a lower bandwidth than a bandwidth associated with said first stream of bits representing said speech when said subrogation indicator is detected.

24. (Original) The speech recognition encoder of claim 23, wherein said feature encoder comprises:

a feature extractor to extract said speech features from said speech; and

a feature compressor to compress said speech features into said second stream of bits.

25. (Currently Amended) A speech recognition decoder, comprising:

a capabilities broadcaster to communicate a speech recognition request, wherein said capabilities broadcaster communicates a subrogation indicator to initiate a communication of a stream of bits over a voice channel at a lower bandwidth than a bandwidth associated with a set of signals representing speech when said subrogation indicator is detected;

a start monitor to monitor for a said stream of bits having speech features;

a feature decoder to decode speech features from said stream of bits; and

a speech recognition module to translate said speech features into text.

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26. (Original) The speech recognition decoder of claim 25, wherein said feature decoder comprises:

- a feature reconstructor to reconstruct speech features from said stream of bits; and
- a feature decompressor to decompress said reconstructed speech features.

27. (Currently Amended) An article comprising:

a storage medium;

said storage medium including stored instructions that, when executed by a processor, result in performing speech recognition by receiving a set of signals representing speech, receiving a request for speech recognition information over a voice channel, wherein receiving said request comprises receiving a subrogation indicator, creating a set of speech features from said signals, and communicating said speech features over said voice channel at a lower bandwidth than a bandwidth associated with said set of signals representing said speech when said subrogation indicator is detected.

28. (Previously Presented) The article of claim 27, wherein the stored instructions, when executed by a processor, further result in receiving said request by receiving a prompt for a voice command.

29. (Original) The article of claim 27, wherein the stored instructions, when executed by a processor, further result in said creating by extracting said speech features from said signals, and compressing said speech features.

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30. (Original) The article of claim 27, wherein the stored instructions, when executed by a processor, further result in said communicating by creating a first stream of bits representing said speech, receiving a second stream of bits representing said speech features, replacing said first stream of bits with said second stream of bits, and sending said second stream of bits over said voice channel.

31. (Original) The article of claim 30, wherein the stored instructions, when executed by a processor, further result in said creating by receiving an analog audio waveform representing said speech, converting said analog audio waveform into a digital audio signal, and compressing said digital audio signal using a voice encoding algorithm.

32. (Original) The article of claim 30, wherein the stored instructions, when executed by a processor, further result in said replacing by determining a start point and an end point for said first stream of bits, determining a start point and an end point for said second stream of bits, and replacing said first stream of bits with said second stream of bits using said start points and said end points.

33. (Original) The article of claim 32, wherein the stored instructions, when executed by a processor, further result in said replacing said first stream of bits with said second stream of bits using said start points and said end points by (a) creating a frame of bits from said start point for said first stream of bits, (b) overlaying said frame of bits with said start point for said second stream of bits, (c) sending said frame of bits over said

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voice channel, and (d) continuing (a)-(c) until said end point for said second stream of bits is reached.

34. (Original) The article of claim 32, wherein the stored instructions, when executed by a processor, further result in said sending by inserting a start indicator before said start point for said second stream of bits, and an end indicator after said end point for said second stream of bits, and sending said second stream of bits with said start and end indicators.

35. (Currently Amended) An article comprising:

a storage medium;

said storage medium including stored instructions that, when executed by a processor, result in performing speech recognition by sending a request for speech recognition information over a voice channel, wherein said sending comprises sending a subrogation indicator to initiate a communication of speech features over said voice channel at a lower bandwidth than a bandwidth associated with a set of signals representing speech when said subrogation indicator is detected, receiving said speech features over said voice channel, and recognizing speech using said speech features.

36. (Previously Presented) The article of claim 35, wherein the stored instructions, when executed by a processor, further result in said sending by sending a prompt for a voice command.

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37. (Original) The article of claim 35, wherein the stored instructions, when executed by a processor, further result in said receiving by (a) determining a start point and end point for a stream of bits, (b) reconstructing said speech features from said start point, (c) decompressing said speech features, (d) sending said decompressed speech features to a speech recognition device, and (e) performing (a)-(d) until said end point is reached.

38. (Original) The article of claim 37, wherein the stored instructions, when executed by a processor, further result in extracting error correction information from said stream of bits, and determining whether said speech features include errors using said error correction information.